

---

--16. A liquid crystal composite material according to claim 4, wherein said liquid crystal layer having said liquid crystal composite material therein enables display for said liquid crystal display device having said pair of substrates with said liquid crystal layer interposed therebetween, and said electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of said substrates.

17. A liquid crystal composite material according to claim 5, wherein said liquid crystal layer having said liquid crystal composite material therein enables display for said liquid crystal display device having said pair of substrates with said liquid crystal layer interposed therebetween, and said electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of said substrates.

E2 18. A liquid crystal composite material according to claim 7, wherein said liquid crystal layer having said liquid crystal composite material therein enables display for said liquid crystal display device having said pair of substrates with said liquid crystal layer interposed therebetween, and said electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of said substrates.--

---

#### **REMARKS**

The indication that claims 1-3 and 8-15 are allowed, and that claim 6 is objected to and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, is acknowledged. By the present amendment, claim 6 has been written in independent form, such that claim 6 should now be in condition for allowance.

As to the rejection of claim 4 under 35 U.S.C. 112, first paragraph, this rejection is traversed insofar as it is understood. The Examiner contends that the specification, while being enabling for the usage of the liquid crystal composite in the present device, does not reasonably provide enablement for other usage such as display device cited in Dir (US 4,506,956). Applicants note that claim 4 defines a liquid crystal composite material adapted to be used in a liquid crystal layer of a liquid crystal display device of a particular construction as recited, which liquid crystal display device is disclosed in the specification, as recognized by the Examiner. That is, Dir does not disclose a liquid crystal display device having a pair of substrates with the liquid crystal layer interposed therebetween and an electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of substrates, wherein the liquid crystal layer includes a liquid crystal composite material having a resistivity which is no greater than  $1 \times 10^{13} \Omega \cdot \text{cm}$  and greater than  $1 \times 10^{10} \Omega \cdot \text{cm}$ . As such, applicants submit that the Examiner recognizes that the disclosure of the present application and therewith the claimed subject matter of claim 4 delimit a liquid crystal display device different from that of Dir, and applicants submit that claim 4 is commensurate in scope with the disclosure of a liquid crystal composite material adapted to be used in a liquid crystal layer of a liquid crystal display device having the structural features as recited, with the liquid crystal composite material having the properties as recited. Thus, contrary to the position set forth by the Examiner, applicants submit that when the features of claim 4 are considered in their entirety, and the specification is properly considered, the specification enables any person skilled in the art to which it pertains, or with which it is most nearly connected to use the invention commensurate in scope with claim 4. Accordingly, applicants request withdrawal of the rejection of claim 4 under 35 U.S.C. 112, first paragraph.

As to the rejection of claims 4-5 and 7 under 35 U.S.C. 112, second paragraph, this rejection is traversed insofar as it is applicable to the present claims, and reconsideration and withdrawal of the rejection are respectfully requested.

In setting forth the rejection, the Examiner contends that the claimed liquid crystal composite material is indefinite because the ingredient in liquid crystal composite material is missing. Applicants note that by the present amendment, claim 5 has been amended to correct an informality therein in referring to a liquid crystal composite material rather than liquid composite material. However, applicants submit that claims 4, 5 and 7 define properties of the liquid crystal material which render such claims in compliance with 35 U.S.C. 112, second paragraph.

Reference is made to the decision of In re Borkowski and Van Venrooy, 164 USPQ 642 (CCPA 1970), wherein the court pointed out that the Examiner's approach to determining whether appellants' claims satisfy the requirements of §112 appears to have been to study appellants' disclosure, to formulate a conclusion as to what he (the examiner) regards as the broadest invention supported by the disclosure, and then to determine whether appellants' claims are broader than the examiner's conception of what "the invention" is. The court indicated that we cannot agree that §112 permits of such an approach to claims. The first sentence of the second paragraph of §112 is essentially a requirement for precision and definiteness of claim language and if the scope of subject matter embraced by a claim is clear, and if the applicant has not otherwise indicated that he intends the claim to be of a different scope, then the claim does particularly point out and distinctly claim the subject matter which the applicant regards as his invention.

Furthermore, reference is made to the decision of In re Swinehart and Sfiligoj, 169 USPQ 226 (CCPA 1971), wherein the court pointed out that there is no support, in holdings of prior cases or in statute, for the proposition that "functional" language,

in and of itself, renders claim improper. That is, the court pointed out that the reciting of a property of a composition without defining the composition does not render the claim indefinite under 35 U.S.C. 112, second paragraph.

In this application, claim 4 defines a property of the liquid crystal composition of a liquid crystal layer utilized in a liquid crystal device having the structural features and operational features as defined, and applicants submit that irrespective of the Examiner's position, there is no requirement to recite the ingredient in the liquid crystal composite material. Applicants further note that the newly presented dependent claims further define the property of the liquid crystal composite material utilized in the liquid crystal layer as enabling display in the liquid crystal device having the structural features as recited. As such, applicants submit that claims 4, 5 and 7 and the dependent claims thereof, including newly added dependent claims 16-18, should be considered to be in compliance with 35 U.S.C. 112, second paragraph.

As to the rejection of claim 4 under 35 U.S.C. 102(b) as being anticipated by Dir (US 4,506,956), this rejection is traversed, and reconsideration and withdrawal of the rejection are respectfully requested.

At the outset, as to the requirements to support a rejection under 35 U.S.C. 102, reference is made to the decision of In re Robertson, 49 USPQ 2d 1949 (Fed. Cir. 1999), wherein the court pointed out that anticipation under 35 U.S.C. §102 requires that each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. As noted by the court, if the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if the element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." Moreover, the court

pointed out that inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

Turning to Dir, and the position as set forth by the Examiner, applicants submit that Dir does not disclose in the sense of 35 U.S.C. 102 a liquid crystal composition adapted for use in a liquid crystal display device having the structural features as recited, with the liquid crystal composition having a resistivity "which is no greater than  $1 \times 10^{13} \Omega \cdot \text{cm}$  and greater than  $1 \times 10^{10} \Omega \cdot \text{cm}$ " (emphasis added). That is, claim 4 sets forth a range of values. Applicants submit that the disclosure of Dir is that the liquid crystal composition has a resistivity greater than  $10^{10} \text{ ohm cm}$  without identifying a resistivity value. For example, a liquid crystal material having a high resistivity which is greater than  $10^{10} \text{ ohm cm}$  does not meet the claimed limitation of claim 4 in the sense of 35 U.S.C. 102. That is, in Dir, the resistivity may have a value exceeding  $10^{13} \text{ ohm cm}$ , which does not fall within the range of values of claim 4. Reference is made to the specification of this application at page 10, lines 9-13 of the specification of this application, it is stated that:

OK, In the conventional active matrix type liquid crystal display apparatus, it is required to use a liquid crystal with a high resistivity of at least  $1 \times 10^{13} \Omega \cdot \text{cm}$ , preferably,  $1 \times 10^{14} \Omega \cdot \text{cm}$ , in order to apply a sufficient voltage even during a non-selected period of time. (emphasis added)

Applicants submit that the conventional active matrix type liquid crystal display device as described in the specification of this application is represented by that device as described in Dir, wherein, as pointed out at page 1, lines 13-20 of the specification, "the electrodes for driving the liquid crystal layer are formed on the surface of two substrates, and transparent electrodes are used, the electrodes facing each other. This is because what is used is a twisted nematic display method (TN method) in which the liquid crystal layer is driven by applying an electric field in a direction vertical to the surface of the substrate." See Figs. 1-4 of Dir and the

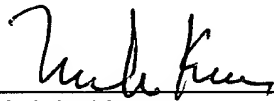
description at cols. 7 and 8 thereof. Thus, it is readily apparent that Dir does not disclose a liquid crystal composition having a resistivity in the range claimed in the sense of 35 U.S.C. 102, and applicants submit that it is not inherent based upon the specific disclosure in the specification of this application that the liquid crystal composition of Dir would fall within the range as set forth irrespective of the fact that Dir does not disclose a liquid crystal display device in which the liquid crystal composition is adapted to be used, as recited in claim 4 and the dependent claims of this application. Accordingly, applicants submit that claim 4 patentably distinguishes over Dir in the sense of 35 U.S.C. 102 and claim 4 should be considered allowable thereover.

Applicants note that claims 5 and 7 and the dependent claims recite features recognized by the Examiner as patentably distinguishing over Dir.

In view of the above amendments and remarks, applicants submit that claims 4, 5, 7 and the dependent claims thereof, claims 16-18, should be considered to be in compliance with 35 U.S.C. 112, and to patentably distinguish over the cited art. Accordingly, issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (503.33612CX1) and please credit any excess fees to such deposit account.

Respectfully submitted,



Melvin Kraus  
Registration No. 22,466  
ANTONELLI, TERRY, STOUT & KRAUS, LLP

MK/cee  
(703) 312-6600

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

Please amend claim 5 as follows:

5. (twice amended) A liquid crystal composite material according to claim 4, adapted to be used in a liquid crystal layer of a liquid crystal display device having a pair of substrates with the liquid crystal layer interposed therebetween, and an electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of said substrates;

wherein said liquid crystal composite material has a resistivity which is no greater than  $1 \times 10^{13} \Omega \cdot \text{cm}$  and not less than  $1 \times 10^9 \Omega \cdot \text{cm}$ ; and

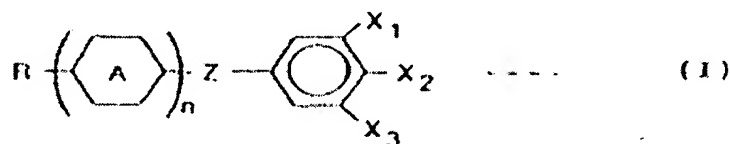
wherein a relation between an elasticity constant K2 and a dielectric anisotropy  $\Delta\epsilon$  of said liquid composite material satisfies the relation  $K2/\Delta\epsilon < 9 \times 10^{-8}$  [dyn].

Please rewrite claim 6 in independent form as follows:

6. (thrice amended) A liquid crystal composite material ~~according to claim 4,~~  
adapted to be used in a liquid crystal layer of a liquid crystal display device having a pair of substrates with the liquid crystal layer interposed therebetween, and an electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of said substrates;

wherein said liquid crystal composite material has a resistivity which is no greater than  $1 \times 10^{13} \Omega \cdot \text{cm}$  and greater than  $1 \times 10^{10} \Omega \cdot \text{cm}$ ;

wherein said liquid crystal composite material includes a liquid crystal chemical compound represented by a general chemical formula (I)



wherein in the formula (I),  $X_1$ ,  $X_2$  and  $X_3$  are selected from a group consisting of fluoro group, cyano group, trifluoromethyl group, trifluoromethoxyl group, nitro group and hydrogen atom, not all three  $X_1$ ,  $X_2$  and  $X_3$  being a hydrogen group; R is selected from a group consisting of alkyl group and alkoxyl group having the carbon number 1 to 10 which can be substituted; Ring A is selected from a group consisting of cyclohexane ring, benzene ring, dioxane ring, pyrimidine ring, and-bicyclohexane ring, Z is selected from a group consisting of single bonding, ester bonding, ether bonding, methylene, and ethylene; and n is 1 or 2.

Please add the following new claims:

--16. A liquid crystal composite material according to claim 4, wherein said liquid crystal layer having said liquid crystal composite material therein enables display for said liquid crystal display device having said pair of substrates with said liquid crystal layer interposed therebetween, and said electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of said substrates.

17. A liquid crystal composite material according to claim 5, wherein said liquid crystal layer having said liquid crystal composite material therein enables display for said liquid crystal display device having said pair of substrates with said liquid crystal layer interposed therebetween, and said electrode structure for generating an electric field having a component predominantly in parallel with one of said pair of said substrates.

18. A liquid crystal composite material according to claim 7, wherein said liquid crystal layer having said liquid crystal composite material therein enables display for said liquid crystal display device having said pair of substrates with said liquid crystal layer interposed therebetween, and said electrode structure for



generating an electric field having a component predominantly in parallel with one of said pair of said substrates.--